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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
ROMAN, LUIS ENRIQUE

ART UNIT	PAPER NUMBER
2836	

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/710,653	BAIN ET AL.	
	Examiner	Art Unit	
	Luis Roman	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *07/27/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Objections

Claim 12 is objected to because of the following informalities: ***"a positive radius of curvature"*** is indefinite without having a point o reference (convexity or concavity in a curve are relatives to the point from where they are looked from).
Appropriate correction is required.

Claim 13 is objected to because of the following informalities: ***"a negative radius of curvature"*** is indefinite without having a point o reference (convexity or concavity in a curve are relatives to the point from where they are looked from).
Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 14, 15, 16, 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Kellerman et al. (US 6946403).

Regarding claim 1 Kellerman et al. discloses an electrostatic wafer holding apparatus (Abstract), comprising: an electrostatic chucking pedestal (Col. 3 lines 10-12 & Fig. 2 element 160), a bi-directional backside conduit in fluid communication with a

backside of said chucking pedestal (Col. 14 lines 45-50 & Fig. 2 element 200), said bi-directional backside conduit in fluid communication with a backside carrier gas supply line (Col. 16 lines 12-18 & Fig. 15 elements 265, 250C, 250B, 100); and said bi-directional backside conduit further in fluid communication with a vacuum supply line (Col. 16 lines 12-18 & Fig. 15 elements 255A, 255B, 250A, 100).

Regarding claim 2 Kellerman et al. discloses the apparatus of claim 1. Kellerman et al. further discloses comprising means for selectively coupling to one of said backside said bi-directional backside conduit carrier gas supply line and said vacuum supply line (Col. 16 lines 12-18 & Col. 16 lines 25-32 & Fig. 15 elements 235, 250A, 250B, 250C).

Regarding claim 14 Kellerman et al. discloses a method (a person of the ordinary skill will understand a method that is intrinsically described by the functioning of the apparatus) for implementing pressure assisted electrostatic chucking, the method comprising: placing a wafer onto an electrostatic chucking pedestal (Col. 3 lines 10-12 & Fig. 2 element 160), introducing a supply of backside carrier gas to a back side of said electrostatic chucking pedestal (Fig. 15 elements 265, 100), monitoring a pressure between said wafer and said electrostatic chucking pedestal to determine whether a threshold level of chucking force exists, and decoupling said backside carrier gas from said backside of said electrostatic chucking pedestal and coupling said backside of said electrostatic chucking pedestal to a vacuum supply whenever the actual level of chucking force is less than said threshold level of chucking force (Col. 10 lines 1-29, Col. 5 line 59 to Col. 6 line 15).

Regarding claim 15 Kellerman et al. discloses the method of claim 14. Kellerman et al. further discloses comprising introducing a front side supply of gas in conjunction with said vacuum supply (Fig. 15 elements 265, 255A, 255B)

Regarding claim 16 Kellerman et al. discloses the method of claim 14. Kellerman et al. further discloses comprising decoupling said vacuum supply from said backside of said electrostatic chucking pedestal and coupling said backside of said electrostatic chucking pedestal to said backside carrier gas whenever the actual level of chucking force meets said threshold level of chucking force (Col. 10 lines 1-29, Col. 5 line 59 to Col. 6 line 15).

Regarding claim 17 Kellerman et al. discloses the method of claim 16. Kellerman et al. further discloses further comprising increasing an electrostatic chucking voltage applied to said electrostatic chucking pedestal whenever said coupling of said backside of said electrostatic chucking pedestal to said vacuum supply is insufficient to create said threshold level of chucking force (Col. 5 lines 19-37).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4, 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman et al. (US 6946403) in view of Deguchi et al. (US 5665166).

Regarding claim 3 Kellerman et al. discloses the apparatus of claim 2. Kellerman et al. does not disclose further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal.

Deguchi et al. teaches further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal (Col. 11 line 55 to Col. 12 line 14, Col. 4 lines 28-33 & Fig. 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kellerman et al. device with the Deguchi et al. device features since Kellerman et al. controls the pressure of the gas (temperature in the wafer) to address differences in the thickness of the wafer, while Deguchi et al. incorporates a circuitry to sense current thru the electrodes to determine the deviation on the surface of the wafer. The detection/measurement and calculation/control a posteriori results easier and more accurate working with current values than with temperature ones.

Regarding claim 4 Kellerman et al. in view of Deguchi et al. discloses the apparatus of claim 3.

Kellerman et al. further discloses wherein said detection circuitry is configured to cause said bi-directional backside conduit to be decoupled from said backside carrier gas supply line and coupled to said vacuum supply line upon a detection of an area of contact area in said wafer (Col. 10 lines 1-29).

Kellerman et al. does not specifically disclose where that detection is based on the curvature of the wafer.

Deguchi et al. teaches further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal (Col. 11 line 55 to Col. 12 line 14, Col. 4 lines 28-33 & Fig. 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kellerman et al. device with the Deguchi et al. device features since the apparatus of Kellerman et al needs flat wafers to work to measure accurately the area of contact between wafer and base of the electrostatic chuck. Moreover having a detection of the curvature will help in determining the exact shape of the wafer and based on this operate the cooling gas system.

Regarding claim 5 Kellerman et al. in view of Deguchi et al. discloses the apparatus of claim 4.
Kellerman et al. further discloses wherein said detection circuitry is further configured to cause said bi-directional backside conduit to be decoupled from said vacuum supply line and re-coupled to said backside carrier gas supply line upon detecting a desired pressure between said wafer and said chucking pedestal (Col. 10 lines 1-29 <sensing/detection: Deguchi et al. device and calculation/controlling: Kellerman et al. device>).

Claims 6, 7, 11 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman et al. (US 6946403) in view of Tong et al. (Patent Application Publication US 2004/0083975)..

Regarding claim 6 Kellerman et al. discloses an electrostatic wafer holding apparatus (Abstract), comprising: an electrostatic chucking pedestal (Col. 3 lines 10-12); a bi-directional backside conduit in fluid communication with a backside of said chucking pedestal (Col. 14 lines 45-50 & Fig. 2 element 200), said bi-directional backside conduit in fluid communication with a backside carrier gas supply line (Col. 16 lines 12-18 & Fig. 15 elements 265, 250C, 250B, 100); and said bi-directional backside conduit further in fluid communication with a vacuum supply line (Col. 16 lines 12-18 & Fig. 15 elements 255A, 255B, 250A, 100).
Kellerman et al. does not disclose having an inner zone and an outer zone, wherein said inner zone and said outer zone are mechanically decoupled from one another.
Tong et al. teaches having an inner zone and an outer zone, wherein said inner zone and said outer zone are mechanically decoupled from one another (Paragraphs 33, 34, 36 & Fig. 4 elements 106<outer zone with a top 110 and a bottom 112>).
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kellerman et al. device with the Tong et al. device features because having this configuration helps reducing the gap controlling in a more effective

way the temperature throughout the waffle and as a result improves the wafer processing.

Regarding claim 7 Kellerman et al. in view of Tong et al. discloses the apparatus of claim 6.

Kellerman et al. further discloses comprising means for selectively coupling said bi-directional backside conduit to one of said backside carrier gas supply line and said vacuum supply line (Col. 16 lines 12-18 & Col. 16 lines 25-32 & Fig. 15 elements 235, 250A, 250B, 250C).

Regarding claim 11 Kellerman et al. in view of Tong et al. discloses the apparatus of claim 6.

Tong et al. further discloses comprising a suitable micro-positioning control mechanism associated with each of said inner and outer zones of said chucking pedestal, wherein a height of said inner and outer zones are independently adjustable with respect to one another (Paragraph 27 & Fig. 6).

Regarding claim 12 Kellerman et al. in view of Tong et al. discloses the apparatus of claim 11.

Tong et al. further discloses wherein said outer zone is configured to be in a raised position with respect to said inner zone when a wafer having a positive radius of curvature is placed upon said chucking pedestal (Paragraph 28).

Regarding claim 13 Kellerman et al. in view of Tong et al. discloses the apparatus of claim 12.

Tong et al. further discloses wherein said inner zone is configured to be in a raised position with respect to said outer zone when a wafer having a negative radius of curvature is placed upon said chucking pedestal (Paragraph 28).

Claims 8, 9, 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman et al. (US 6946403) in view of Tong et al. (Patent Application Publication US 2004/0083975) and Deguchi et al. (US 5665166).

Regarding claim 8 Kellerman et al. in view of Tong et al. discloses the apparatus of claim 7.

Kellerman et al. in view of Tong et al. does not disclose further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal.

Deguchi et al. teaches further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal (Col. 11 line 55 to Col. 12 line 14, Col. 4 lines 28-33 & Fig. 10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kellerman et al. in view of Tong et al. device with the Deguchi et al. device features since Kellerman et al. controls the pressure of the gas (temperature in the wafer) to address differences in the unevenness of the wafer, while Deguchi et al. incorporates a circuitry to sense current thru the electrodes to determine the deviation on the surface of the wafer. The detection/measurement and calculation/control a posteriori results easier and more accurate working with current values than with temperature ones.

Regarding claim 9 Kellerman et al. in view of Tong et al. and Deguchi et al. discloses the apparatus of claim 8.

Kellerman et al. further discloses wherein said detection circuitry is configured to cause said bi-directional backside conduit to be decoupled from said backside carrier gas supply line and coupled to said vacuum supply line upon a detection of an area of contact area in said wafer (Col. 10 lines 1-29).

Kellerman et al. does not specifically disclose where that detection is based on the curvature of the wafer.

Deguchi et al. teaches further comprising detection circuitry for detecting a curvature present in a wafer placed on said chucking pedestal (Col. 11 line 55 to Col. 12 line 14, Col. 4 lines 28-33 & Fig. 10).
It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Kellerman et al. device with the Deguchi et al. device features since the apparatus of Kellerman et al needs flat wafers to work to measure accurately the area of contact between wafer and base of the electrostatic chuck. Moreover having a detection of the curvature will help in determining the exact shape of the wafer and based on this operate the cooling gas system.

Regarding claim 10 Kellerman et al. in view of Tong et al. and Deguchi et al. discloses the apparatus of claim 9.
Kellerman et al. further discloses wherein said detection circuitry is further configured to cause said bi-directional backside conduit to be decoupled from said vacuum supply line and re-coupled to said backside carrier gas supply line upon detecting a desired pressure between said wafer and said chucking pedestal (Col. 10 lines 1-29).

Claim 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kellerman et al. (US 6946403).

Regarding claim 18 Kellerman et al. discloses the method of claim 17.
Kellerman et al. does not specifically disclose determining when a wafer is defective.
It is intrinsically disclosed that if the surface of the wafer is far from being flat enough for the process of chucking the controller will either determine that the wafer is defective or just break it because it will not be able to support the electrostatic chucking.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis E. Román whose telephone number is (571) 272 – 5527. The examiner can normally be reached on Mon – Fri from 7:15 AM to 3:45 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272-2800 x 36. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system.

Status information for unpublished applications is available through private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Luis E. Román
Patent Examiner
Art Unit 2836

LR/033006

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